SUMMARY OF THE INVENTION

The invention pertains to a method and apparatus allowing for gas flow into and/or out of a container assembly. The container assembly comprises a container having a sealing surface, and a cap having a sealing surface. The sealing surface s of the container or the cap or both given a texture that is polished or made coarser, as desired In this way the sealing surface of the container and the cap cooperate with one another to form a seal and to allow gas to flow into or out of the container assembly.

In one embodiment, the container includes a base and a neck and the cap includes a protrusion. In such an embodiment, at least a portion of the neck is the sealing surface of the container, and at least a portion of the protrusion is the sealing surface of the cap.

The sealing surfaces cooperate with one another, and temporarily deform a shape of the cap, the neck and/or both. The cooperation also forms a seal between the cap and the container, and in one embodiment, an extent of the deformation can be limited by contact between stopping surfaces, blocking tighter engagement of the cap with the container.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a side perspective view of the cap and container assembly with the cap secured to the container;

FIG. **2** is a top perspective view of the cap and container assembly;

FIG. **3** is a cross-sectional view taken along line 3-3 depicted in FIG. **2**;

FIG. **4** is an enlarged view of the identified portion in FIG. **3**;

FIG. **5** is a similar view as illustrated in FIG. **4**, but of an alternate embodiment; and,

FIG. **6** is a detailed view of roughness values and textures that can be used in FIG. **4**.

MARKED VERSION SHOWING CHANGES MADE

SUMMARY OF THE INVENTION

The invention pertains to a method and apparatus allowing for gas flow into and/or out of a container assembly. The container assembly comprises a container having a sealing surface, and a cap having a sealing surface. The sealing surface of the container, the cap and/or both is (are) roughened. Further, the sealing surface of the container and the cap cooperate with one another to form a seal and to allow gas to flow into or out of the container assembly.

In one embodiment, the container includes a base and a neck and the cap includes a protrusion. In such an embodiment, at least a portion of the neck is the sealing surface of the container, and at least a portion of the protrusion is the sealing surface of the cap.

The sealing surfaces cooperate with one another, and temporarily deform a shape of the cap, the neck and/or both. The cooperation also forms a seal between the cap and the container, and an extent of the deformation can be limited by contact between stopping surfaces, blocking tighter engagement of the cap with the container.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a side perspective view of the cap and container assembly with the cap secured to the container;

FIG. **2** is a top perspective view of the cap and container assembly;

FIG. **3** is a cross-sectional view taken along line 3-3 depicted in FIG. **2**;

FIG. **4** is an enlarged view of the identified portion in FIG. **3**;

~~FIG. **4a** is an enlarged view of the identified portion in FIG. **4**;~~

FIG. **5** is a similar view as illustrated in FIG. **4**, but of an alternate embodiment; and,

MARKED VERSION SHOWING CHANGES MADE

FIG. **6** is a detailed view of roughness values and textures that can be used in FIG. **4a**.

DETAILED DESCRIPTION OF THE INVENTION

The invention pertains to a method and apparatus for controlling gas flow into or out of a container assembly that is comprised of a cap **20** and a container **10**. The container **10** and the cap **20** each have a sealing surface, and the sealing surfaces cooperate with one another. The sealing surface of the cap **20**, the sealing surface of the container **10**, or both, are roughened to allow for gas to flow into and/or out of the container assembly.

FIGS. **1** through **4** show a first embodiment of a container assembly embodying aspects of the invention. The first embodiment comprises a container **10** and a cap **20** designed for mating engagement with each other and to allow for gas flow into and/or out of the container assembly. The container **10** and cap **20** are ideally manufactured as molded plastic parts, preferably composed of polypropylene, polyethylene, or similar materials.

The first embodiment in FIG. **3** shows the container **10** including a base **11** and a neck **12**. The neck **12** is the portion of the container **10** to which the cap **20** is engaged, and the end of the neck **12** defines a mouth of the container. The cap **20** includes a curved top **21** and a skirt **22** depending peripherally from the top **21**. A portion of the exterior surface of the neck **12** is threaded, a portion of the interior surface of the skirt **22** is threaded, and the cap **20** can be secured to the container **10** by mating engagement of those two threaded-portions.

Also shown in FIG. **3**, is a number of stops or projections **23** on the interior surface of the skirt **22** that are designed to contact a shoulder **13** on the exterior surface of the neck **12** at some time as the cap **20** is secured to the container **10**. Those projections **23** and shoulder **13** act as stopping surfaces to block any tighter engagement of the cap **20** and the container **10** and to